BUSINESS CONTINUITY

Real-Time Remote Mirroring for Novell LANs
via Standard Communication Channels

WINNER
Data
Communications
LAN Times
BEST
OF SHOW
1995
LAS VEGAS

OFF-SITESERVER
V.35™

" I firmly believe that some companies have hesitated jumping into the client/server arena until a product such as OFF-SITESERVER became available. This is a product whose time is long overdue. "

Robert Janusaitis
Certified Disaster
Recovery Planner
Business911
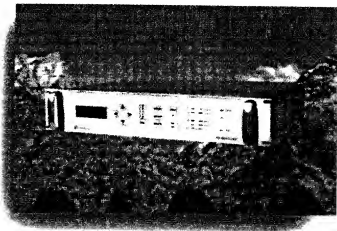
🖫 MiraLink Off-SiteServer V.35™

Product Overview

OFF-SITESERVER V.35™ is the premier product for real-time mirroring of data to a file server at a remote site. It provides a cost effective solution for the client/server arena while yielding true wide area fault tolerance.

Using standard disk mirroring under Novell's NetWare™, OFF-SITESERVER V.35™ mirrors all files down to the transaction to a remote site, via standard telecommunication lines or routable protocols. Once this mirror is implemented, the remote server is essentially a duplicate of the host NetWare™ server. All files, including open, closed, bindery, NDS, are mirrored across a high speed communication link. In the event of a main server failure, the remote server can be started as a NetWare™ server with up-to-date file information in a matter of moments.

Integral to OFF-SITESERVER is the SmartAck™ (smart acknowledge) system, which allows the OFF-SITESERVER units to pre-acknowledge all disk write information prior to its communications link transfer. This system, in combination with our non-volatile buffer, provides the key to minimizing dirty cache buffers and outstanding disk requests during periods of heavy activity. The SmartAck™ system also allows the selected communication channel to operate in the background, non-obtrusive to the host server.

Working in accord with our SmartAck™ system, MIRALINK™ has an NLM that inhibits disk reads over the wide area network. This NLM, developed jointly with Novell, reduces traffic and helps improve network performance.

The V.35 output of the OFF-SITESERVER units provides a myriad of options with regards to a preferred communications channel interface. Through an external CSU/DSU or compatible bridge these units can interface to: ATM, T1/E1, fractional T1/E1, ISDN, frame relay, ethernet, FDDI, token ring, etc. Twisted pair connections up to 5,000 ft. can also be supported.

Our second generation interface allows the network administrator to directly control many of the OFF-SITESERVER's functions through a user friendly menu based touchpad. These controls allow direct monitoring of performance as well as customized configuration.

The standard OFF-SITESERVER V.35™ configuration consists of a pair of rack-mountable devices, interface cables, Vinca™ Standby*Server32*™ link cards and software.

OFF-SITESERVER V.35 ™

Real-Time Remote Mirroring for Novell LANs
via Standard Communication Channels

SPECIFICATIONS

Total System Throughput

MAX (with T1 lines).......... up to 360Mbytes/hr
MIN (with 56Kbs)................ up to 28Mbytes/hr

Interfaces

Novell NetWare .... ver 3.x and 4.x
User interface..................... Keypad, LCD, LED
Data Interface .... V.35 DTE
HDLC, SDLC Protocol
Via DB25 (EIA-530) Connector

Electrical

Operating voltages 120/240VAC, 60/50Hz
Power consumption 37W

Dimensions

2U rack-mount .... 3.5 x 18 x 19 inch housing

Buffer
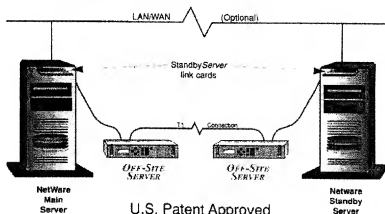
NonVolatile.. 1.2GB
or 4.0GB option available

FEATURES

Network Characteristics

- Provides a high level of fault-tolerance to the enterprise network.

- Complements existing back-up strategies and "hot site" strategies.

- Reduces reliance on back-up tape storage without requiring users to log off the network.

- Encourages disaster prevention and recovery efforts.

- Utilizes SmartAck™ technology (hierarchical pre-acknowledge), to reduce dirty cache buffers and maintain LAN performance.

- Maintains mirroring in the event of a temporary line disruption.

- Provides diagnostic information via keypad and LCD display.

- NLM utility inhibits disk reads to remote server to improve network performance.

Simplistic Connectivity

LAN/WAN (Optional)

Standby Server
link cards

T1 Connection

OFF-SITE SERVER   OFF-SITE SERVER

NetWare Main Server   Netware Standby Server

U.S. Patent Approved

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Magazine Articles

"Having a mirrored NetWare server next to your main machine will be of enormous benefit should your main server fail. But it the building catches fire, or the roof collapses, both servers will be destroyed. If it's essential to get your company up and working immediately after a total disaster, you're going to have to create a complete office environment at a remote site. MiraLink's Off-SiteServer V.35 can help you do just that. Off-SiteServer is aimed at companies that can't afford to lose business due to fire, flood and other catastrophes. It's not cheap, but if it's the difference between going out of business and surviving, cost won't be an issue."

> **Louise Lindop**, *PC Magazine*, UK, July, 1996

"Because MiraLink's Off-SiteServer buffers the data, such low-speed WAN links as 56k bps, ISDN or fractional T-1 lines may be used. Therefore, cheaper WAN connections can quickly pay back the cost of the expensive MiraLink hardware. Enterprises with infrequent but massive spikes of data mirroring, such as with database downloads, do not need high WAN bandwidth for Off-SiteServer.

"Just for kicks, we vandalized the WAN link (by pulling out a cable) to see what Off-SiteServer would do. It merely noted that the link was down and continued to buffer the data. We even swapped a 56K bps link for a T-1 in midstream, then back again, with no ill effects. We were impressed."

> **Ken Phillips**, "Skirting Server Disaster", *PC Week*, June 17, 1996

"For network managers, ensuring server uptime is the chief challenge of their jobs: natural disasters, criminal acts, human error, parts failures and just plain bad luck can all bring a network to a crashing halt. For peace of mind and complete protection...the most thorough solution is to clone a vital server, either across the campus for local fault tolerance or off-site for full-blown disaster recovery.

"MiraLink Corp., maker of the WAN-based Off-SiteServer V.35, solves the WAN bandwidth problem by first buffering all mirror requests to a large hard disk in MiraLink's box. Even if the WAN link fails, mirroring can still occur at top speed as a local disk mirror. The buffer also makes it possible to use low-speed WAN connections, down to 56k bps, thereby saving money on the corporate communications bill."

> **Ken Phillips**, "For safety, nothing beats server cloning", *PC Week*, June 17, 1996

"Off-SiteServer provides NetWare installations with a unique way to distribute server tolerance across the wide area network, using anything from analog dial-up lines for near-real-time backup to T-1 links for actual server mirroring. By enabling centralized backup of multiple remote sites and protecting users from disasters at a particular location, Off-SiteServer makes the PC-LAN environment a more robust platform for business-critical applications."

Susan Breidenback, Editor in Chief, *LAN Times*, April, 1995

"If you could foresee a disaster coming to your customer's network, would you: a) make sure all the backups were done and bring a set of archive tapes off-site; b) install a standby server in a mirrored configuration; or c) install a standby server in a mirrored configuration at your own office and let it work remotely?

"If you think the third option sounds good, check out Off-SiteServer V.35, a solution developed by MiraLink in conjunction with Vinca and Novell. Off-SiteServer V.35 lets you build a mirrored file server environment using telecom channels or routable protocols. Building such an environment is not as tricky— or costly—as you might think."

Dave Brambert, "Stand By, Remotely", *Network VAR*, January, 1996

"MiraLink's Off-SiteServer works with Vinca's StandbyServer hardware and software to allow the remote server to be a distant site. That capability is 'particularly attractive for disaster-recovery purposes,' say Robert Janusaitis, a consultant with BSG Consulting in Houston. 'After the World Trade Center (bombing), a lot of people will want this capability,' adds Paul Mason, research mgr., system level software at International Data."

Paul Strauss, "NetWare: Higher Availability at Lower Cost", *Datamation*, Nov. 15, 1994

"Off-SiteServer includes software and two rack-mountable units. One unit remains at the host site and is connected to the second, a remote unit, via a dedicated T1 or E1 telephone line, making the system safe from any disaster that may befall the host area. 'Right now there are a lot of mainframe and minicomputer products that do what this does, but Off-SiteServer is relatively unique in a LAN environment,' said Jim Greene, an analyst with BIS Strategic Decisions, in Norwell, Mass."

Cate T. Corcoran, "MiraLink Mirrors Servers for Real-time Access", *Info World*, September 19, 1994

Network edition

FIRST LOOKS

MiraLink Off-Site Server V.35

If you need total file server redundancy, the MiraLink Off-Site Server V.35 system lets you keep your standby server as far from your main site as you want, while still ensuring that it'll be kept up-to-date.

HAVING A MIRRORED NET-Ware server next to your main machine will be of enormous benefit should your main server fail. But if the building catches fire, or the roof collapses, both servers will be destroyed. If it's essential to get your company up and working immediately after a total disaster, you're going to have to create a complete office environment at a remote site. MiraLink's Off-Site Server V.35 can help you do just that.

MiraLink has taken the Vinca Standby Server software and server link cards (see *PC Magazine*, Network Edition, May 1995), and added extra functionality to allow main and standby servers to be located on the other side of the world, if you want. Comprising a pair of rack-mountable processor units, Vinca link cards for the NetWare servers, and some NLMs for both your main and remote sites, it

lets you use public carrier-leased circuits, running at KiloStream or MegaStream speeds to connect the two systems, creating a mirror image of your NetWare network anywhere. And it'll always be up-to-date.

An expansion on NetWare's own SFT disk mirroring capabilities, the Off-Site Server system copies all data being written to the file server, and transmits it over a leased circuit to the remote system, which then writes it—in real-time—to the file server it's attached to. The system is transparent to NetWare (it sees the mirrored disk as being local to it), although the MiraLink software prevents disk reads over the wide-area link, which would adversely affect performance.

The Off-Site Server unit has a front panel LCD from which you can carry out simple configuration and diagnostic steps. You're more likely, though, to use the standard NetWare console monitor at your main site to keep track of what's happening, since it will monitor the status of its mirrored disk, not realising that it might be miles away. At your backup site, the remote Off-Site system constantly monitors the status of the main file server, polling for updates and keep alives. If the main site does fail, though, you'll have to get someone to manually set the back-up server to take over.

If you're carrying out maintenance on your main file server, you might want your users to be able to access the standby server

▲ The rack-mountable Off-Site Server unit connects to your file server and to a leased circuit, which then connects to the standby system at your remote site.

from the main site. In this case, you must install a network connection between the two sites, in addition to the V.35 circuit used to connect the two Off-Site Servers, since this leased line is used for disk writes only. If you have more than one file server, you'll need a corresponding number of pairs of Off-Site Servers for each.

Off-Site Server is aimed at companies that can't afford to lose business due to fire, flood and other catastrophes. It's not cheap, but if it's the difference between going out of business and surviving, cost won't be an issue.
—*Louise Lindop*

✎ Circle 361 on reader service card

For safety, nothing beats server cloning

TECH VIEW *Failover solutions can keep networks humming in the face of disasters*

BY KEN PHILLIPS

For network managers, ensuring server uptime is the chief challenge of their jobs. Natural disasters, criminal acts, human error, equipment failures and just plain bad luck can all bring a network to a crashing halt. For peace of mind and complete protection, companies maintain a cloned backup that can immediately restore for a disabled server.

Enterprises have long been aware of the need for server fault tolerance, but in the language of the marketplace, fault tolerance encompasses everything from simple uninterruptible power supplies and redundant power supplies in mirrored drives, RAID arrays and environmental sensing.

These solutions only keep a server up through ordinary hardware failures and are ineffective if and when the entire roomful of equipment is wiped out. Clustering techniques that share the network load among several distributed computers are only a partial solution. The most thorough solution is to clone a vital server, either across the campus for local fault tolerance or off-site for full-blown disaster recovery.

Cloning, unfortunately, isn't so easily done. The hardware is simple to duplicate, but the software is another matter. To be effective, a new server must have current copies of all the

organization's applications, databases and transactions. Several technologies—including disk mirroring, replication and auto failover—help meet the challenge, and many enterprises combine techniques to buy into the best insurance against downtime.

REPLICATE AND RESTORE

Over the years, administrators have learned to faithfully perform backups of their server data, but as good as network backups are, they're not an ideal fault-tolerance solution for several reasons.

Backups store files rather than transactions, which means files must be closed in order to be backed up. Backups take tremendous amounts of time to restore, making them worthless in a transaction-intensive emergency where every second of server downtime is a disaster. Backups also do not store information about the server itself, such as the NOS configuration, directory services or installed drivers. Even worse, a restoration cannot be performed unless the new PC already has the NOS and the tape-backup software installed, and these processes alone can take hours.

A technology called replication solves most of these deficiencies. Stac Inc.'s Replica for NetWare streams all server data onto tape,

including partition and boot-sector data, OS and NOS, NDS tree, and files—open or closed. In a disaster, an administrator can simply boot an out-of-the-box PC server from a Replica for NetWare disk, place the tape into its drive, and within 15 to 20 minutes have a completely functional replica of the original server.

While the restoration process is fast, the files are only as current as the last replication performed, perhaps a day or more. The program can accommodate open files as well, although writes to them are delayed a few minutes while the replication is being completed.

DISK MIRRORING GOES REMOTE

While servers commonly mirror disks, organizations are now using the technique for fault tolerance by mirroring disks to remote locations across the LAN or WAN. The main stumbling block to remote disk mirroring is bandwidth. If the mirroring system does not use a dedicated network link, something must be done to keep the mirroring out of the way of productive work.
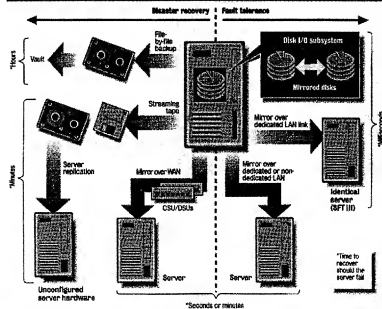
Vendors, as always, have come to the aid with several solutions to the bandwidth problem. One approach used by several products is to provide a throttle—a software switch that lets managers prioritize mirroring requests vs. user requests. NetWare, for example, has safeguards built in to help prevent falling too far behind in the mirror, so companies that want to emphasize either fast response to the users or up-to-the-second mirroring accuracy can do so simply by defining the priority.

Horizons Technology Inc. provides a throttle in its LANshadow product as well in another feature that allows managers to set the mirrored server to either run continuously or be automatically updated according to a schedule—say, at 8 every day. On the downside, LANshadow mirrors only entire files, which can hamper performance, especially over a slower connection. In contrast, products such as Network Specialists Inc.'s

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COVER ME

Although there are many server fault-tolerance solutions, the most thorough one is to clone a vital server, either across the campus for local fault tolerance or off-site for full-blown disaster recovery.

PRESERVING SERVER UPTIME—VARIETIES OF PROTECTION

Disaster recovery ← → *Fault tolerance*

- File-by-file backup
- Vault
- Streaming tape
- Server replication
- Mirror over WAN
- Unconfigured server hardware
- Server
- *Hours / Weeks*

- Disk I/O subsystem
- Mirrored disks
- Mirror over dedicated LAN link
- Mirror over dedicated or non-dedicated LAN
- CSU/DSUs
- Server
- Identical server (SFT III)
- *Milliseconds / Seconds or minutes*

Time to recover should be the server fail

Cloning
from Page N3

Double-Take transfer only the file changes, keeping traffic reduced to the bare minimum.

MiraLink Corp., maker of the WAN-based Off-SiteServer V.35 (see the review on Page N1), solves the WAN bandwidth problem by first buffering all mirror requests to a large hard disk in MiraLink's box. Even if the WAN link fails, mirroring can still occur at top speed as a local disk mirror. The buffer also makes it possible to use low-speed WAN connections, down to 56K bps, thereby saving money on the corporate communications bill.

All of the products mentioned here mirror open files, such as huge database files that are updated record by record, although I ANshadow, which does not do so automatically, has to be set up to support open-file mirroring. LANshadow and Double-Take can also mirror multiple servers to a single backup server.

QUICK SWITCH TO STANDBY

Whatever a company's standby procedure, it's important to get it up and running as quickly as possible. Auto failover, a feature built into many mirroring products, reduces the time required to get the standby running. Many mirroring products let the administrator decide when to switch to standby, a process that may take anywhere from 15 to 30 minutes. Such a delay is generally more in line with disaster recovery scenarios than fault tolerance, which should be immediate.

MAINTAIN YOUR INTEGRITY

LANtegrity for NetWare switches to its standby within 15 seconds. It doesn't require that the server be rebooted, and one standby can be used to protect multiple servers.

Vinca Corp.'s StandbyServer 2.0 for NetWare provides auto failover, rebooting the standby within a minute if the connection to the primary goes south. Its preferred configuration is to mirror over a dedicated LAN (see the review on Page N1).

Network Integrity Inc.'s LANtegrity for NetWare switches to its standby within 15 seconds. The software doesn't require that the server be rebooted, and one standby can even be used to protect multiple servers. However, users still have to log in again and might have to wait while some of their files are loaded from backup media. The program works by creating an online data vault and keeping frequently used files on disk while archiving less frequently used files on tape autoloaders.

NT servers can be outfitted with a 60-second auto failover with Octopus Technologies Inc.'s Octopus for Windows NT Version 1.5, although the product cannot mirror NT system files. (For a review of Octopus for Windows NT, see PC Week Netweek, Nov. 6, 1995, Page N16.)

If an enterprise needs instantaneous failover, Novell Inc.'s NetWare 4.1 SFT III may most closely fit the bill. Provided the standby server has identical equipment to the primary, the standby can step in instantly and transparently without missing a transaction. SFT III comes close to ensuring 100 percent uptime for NetWare servers, but applications do have to be written to take advantage of SFT III before they can receive all the benefits of the fault tolerance.

Windows NT servers can now take advantage of a similar solution in the form of MIAI. 1, software from Marathon Technologies Corp. that was released in mid-May. MIAI. 1, which divides tasks by subsystem, consists of three off-the-shelf, name-brand PCs, two configured as Windows NT workstations and the third as a server. The workstations act as redundant I/O processors, handling disk and network traffic, and the server is diskless, which is designed to enhance its own internal reliability. ∎

Contributing Editor Ken Phillips can be reached at kenp@sunrise.alpinet.net.

NetworkVAR Stand By, Remotely

If you could foresee a disaster coming to your customer's network, would you a) make sure all the backups were done and bring a set of archive tapes off-site; b) install a standby server in a mirrored configuration; or c) install a standby server in a mirrored configuration in your own office and let it work remotely?

If you think the third option sounds good, check out Off-Site-Server V.35, a solution developed by MiraLink (Orem, Utah) in conjunction with Vinca (also based in Orem, Utah) and Novell. Off-SiteServer V.35 lets you build a mirrored file server environment using telecom channels or routable protocols.

Building such an environment is not as tricky—or costly—as you might think. According to Ron McCabe, MiraLink's vice president, "All [you] need is a 56Kbps line. That handles most situations. Because we use a V.35 interface, we can hook up wirelessly and set up a dedicated link that way, or we can route it through a network. What we do well is manage bandwidth."

McCabe tells of a trading firm in New York that has implemented a remote standby configuration. This firm uses a 56Kbps line to keep everything mirrored. "The lease cost [of a 56Kbps line] is a couple hundred dollars a month," says McCabe. "If [the firm] used fiber from Water Street to Uptown, it would cost about a million dollars to install the line, plus all the monthly T-1 charges."

In addition to saving your clients money in setup and ongoing charges, MiraLink overcomes the geographical limitations involved in the mirroring process. Vinca's StandbyServer, which is integral to the MiraLink solution, provides mirroring by using a disk driver and a pseudo disk controller on the primary server, which passes data to a matching backup server. The backup server has the same controller and file management system. The primary server thinks it's mirroring two local partitions within NetWare.

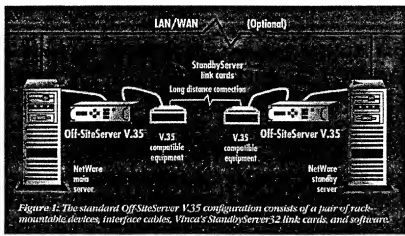The Vinca-only solution is fast—it transfers information at approximately 1MBps. However, the primary and backup servers must be in close prox-imity; they are connected by a custom serial interface cable that has practical limits of approximately 50 feet. This solution is good for server failure, but it is vulnerable to less frequent but more traumatic events, such as earthquake, flood, or fire.

Here's how the MiraLink solution works. The main server, running NetWare and Vinca's software, has its mirroring activity intercepted by the Off-SiteServer V.35 (one Off-SiteServer is necessary at each end; see Figure 1). Inside the main server's Off-SiteServer is an 850MB hard drive that acts as a non-volatile buffer for the server data. Once the data is in the buffer, NetWare and Vinca are finished with their tasks at the main server.

"We actually wrote a disk operating system for [the buffering] part of the solution," McCabe states. "Part of [the disk operating system] does the spoofing or preacknowledgement techniques" that allow the NetWare/Vinca/MiraLink handoff to function.

A separate, third-party CSU/DSU takes the data from the Off-SiteServer on the primary-server end and passes it over T-1 or E-1, ISDN, or 56Kbps lines. (An optional configuration, shown in the figure, uses standard LAN/WAN protocols rather than a communications link.) The data is then passed to the server via the remote Off-SiteServer device, whose non-volatile buffer remains quiet unless a read request comes from the primary server.

In standard mirroring, NetWare uses an algorithm to process read requests to the "best" available drive. It's not difficult to

Figure 1: The standard Off-SiteServer V.35 configuration consists of a pair of rack-mountable devices, interface cables, Vinca's StandbyServer 32 link cards, and software.

see, however, that the multiple read requests could cripple a system such as MiraLink by straining the usually sufficient 56Kbps of bandwidth used in its minimum configuration. An NLM disables this "split-seek" function of NetWare. To bolster safe mirroring, McCabe adds that MiraLink "...strongly recommends RAID solutions."

MiraLink's key target customers are in the financial markets. However, McCabe says, "Hospitals are another hot market,

and it's a market that found us. Patient records can't go off-line." He says that MiraLink is building a reseller base of VARs with experience in these markets. To ensure a good solution, MiraLink reviews the installation with first-time VARs and trains them (and their customers) at the same time.

Off-SiteServer V.35 is available for $15,985, not including the CSU/DSU or the Vinca software.

—Dave Brambert

LAN TIMES®

PREVIEW

Making the Most of Mirroring

Vinca and MiraLink offer enhanced mirrored-server solutions

By Dennis Williams

If you're searching for the highest-level server mirroring, nothing takes the place of Novell Inc.'s SFT III, which goes beyond simple disk mirroring to entire file-server mirroring, including processing. But it's an expensive option that only those who absolutely cannot afford downtime will find worth the cost.

With other mirrored-server solutions, when a server goes down, users lose connections and must reboot and log back in. If this is satisfactory, check out Vinca Corp.'s StandbyServer (SBS) 32, a Novell NetWare server-mirroring product that is the foundation for a handful of other products, including Vinca's Campus StandbyServer and SnapShot Server and MiraLink Corp.'s Off-SiteServer V.35. Because these products build on SBS 32's functionality and are best used together, we evaluated the solution as a whole.

Disk mirroring provides only a moderate level of fault tolerance because mirrored drives are housed in the same computer. Any fault, other than a single disk drive failure, will bring the server down and interrupt access.

SBS 32

SBS 32 achieves a higher level of protection because the mirrored disk can be located in another computer and in a different location. NetWare's mirroring feature will continue to function as if the mirrored disk were local.

SBS 32, available for more than a year, supports NetWare 3.x and NetWare 4.x. Vinca has also announced SBS versions for IBM OS/2 and Microsoft Windows NT. This will be the first product of its kind for OS/2, which should boost OS/2's attractiveness as an

Mirroring
Continued from previous page

applications-server platform.

SBS 32 includes two Vinca adapters (EISA, ISA, and Micro Channel Architecture buses are supported) and a proprietary cable, which crosses a high-speed 160Mbps link that keeps traffic off existing network cabling. All you need to provide is a backup file server configured like your primary server and loaded with a runtime copy of NetWare 3.12 (included with SBS 32).

After you link servers with the proprietary cable, you can install the SBS 32 software. A diagnostic utility helps determine whether the physical link is set up properly. You'll probably want to follow the manual closely during installation, however, because it's easy to get confused about which files should be on the primary server and which should be on the backup.

When both servers begin communicating, an activity meter shows the bandwidth utilization of the proprietary link, and the Mirror Status utility shows the progress of your server synchronization.

Once we synchronized our partitions, we turned off the primary server. SBS 32 delivered a connection error to the workstation console, and the SBS AutoSwitch feature successfully rebooted the standby server using the original NetWare license.

Campus StandbyServer

SBS 32 has a significant downside: Its link can be no longer than 50 feet. Enter Campus StandbyServer, identical to SBS 32 except that the proprietary NICs and cable are replaced with Digital Equipment Corp.'s FDDI or Copper Distributed Data Interface (CDDI) NICs. The adapters are available in EISA and PCI.

Fiber cable allows the servers to be separated by up to 1.6 miles. Campus SBS can run on a dedicated fiber link, or you can tie in to an existing fiber backbone.

The installation procedure is the same as with the SBS 32. For convenience, we recommend installing the software when the servers are side by side.

SnapShot Server

To up the fault-tolerance ante further, Vinca's most recent offering, SnapShot Server, backs up mirrored-server data on a standby server, including live database files, by adding a buffer volume to the standby server, where a snapshot of the data is stored.

MiraLink's Off-SiteServer transmits mirrored data across a wide-area link.

Snapshots allow all files, even open files, to appear closed and available for backup. The entire process is conducted on the standby server, so no load or additional overhead is required from the primary server.

Installing SnapShot Server is easy; simply copy an NLM to the backup server and modify the AUTOEXEC.NCF file to load the NLM on startup. Restart both servers and you're done—assuming you've attached the appropriate tape-backup hardware.

You then need to specify when you want SnapShot Server to take its snapshot and how often you want snapshots taken.

Off-SiteServer V.35

If you need protection against same-city faults, MiraLink's Off-SiteServer fools SBS 32 into thinking that the standby server is at the other end of the proprietary cable. However, that cable actually plugs in to Off-SiteServer's box, which then transmits the mirrored data across any V.35-compatible wide-area link.

To use Off-SiteServer, you must have a wide-area link, V.35-communication equipment such as a DSU/CSU (data service unit/channel service unit), V.35 cables, and SBS 32.

Setting up Off-SiteServer is simple. We needed documentation only to remove a transputer chip from the Vinca adapter, and MiraLink provides the necessary chip puller. Once the chip is removed and a jumper on the Vinca adapter is changed, simply plug a cable from the Vinca adapter in to the Off-SiteServer box and connect the box to a DSU/CSU or other V.35 equipment. The process must be repeated for both primary and standby servers. Two Off-SiteServer boxes are required, one for each server.

The only software that ships with Off-SiteServer is a No Split Seeks NLM, NOSPLTSK.NLM. When disk mirroring is enabled, split seeks allow NetWare to read data off the fastest disk in the mirrored set. Disabling split seeks forces NetWare to seek only on the local disk. Other than that, the hardware uses SBS 32's console and is transparent to the system.

The V.35 unit has a four-line LCD display and buttons for Status, Setup, and Diagnostics. There are also several LEDs that show configuration information, transmissions, receptions, and nonvolatile buffer status.

The unit includes an 812MB Mode 4 IDE hard disk, which uses a proprietary OS for optimum performance, for the nonvolatile buffer. The four Inmos Ltd. transputers work in parallel and can simultaneously handle up to 17 transactions.

Off-SiteServer uses pointers to track data. Data is not eliminated from the local-server's buffer until an acknowledgment is received from the remote system.

If the link fails, the buffer captures data until the link is re-established. If the buffer fills while the link is down, the primary server continues to operate without a mirror. It remirrors on reconnection, first to the buffer and then to the standby server.

If the primary server fails, most data

Vinca's Campus StandbyServer uses Digital's FDDI or CDDI NICs to extend the link between mirrored servers to up to 1.6 miles.

will be in the nonvolatile buffer; only "dirty" cache data is lost. Only if both the primary server and Off-SiteServer go down will data in the buffer be lost.

To minimize data loss, you can use a faster link. Check out the management program at MiraLink's World Wide Web site, which analyzes server activity and reports bandwidth requirements for your WAN link.

The Off-SiteServer works with all V.35-supported links, including T-1, FT-1, ISDN, frame relay, E-1, and routers with V.35 support. The units are not flash-upgradeable, but all updates are free.

OptiSpan

Predating Campus SBS and Off-Site-Server V.35 is MiraLink's OptiSpan, which features two boxes that attach to your primary and backup servers. To link the servers, connect the proprietary Vinca cable and the fiber cable to the OptiSpan unit. OptiSpan works like Off-SiteServer but has a link limit of five kilometers.

Once you've attached the servers, you simply load NOSPLTSK.NLM to begin mirroring. The solution is clean and transparent.

Vinca's SBS 32 is the foundation for an excellent fault-tolerance strategy. The products that use it as a platform, includ-

ing Vinca's Campus SBS and SnapShot Server and MiraLink's Off-SiteServer V.35 and OptiSpan, add to NetWare's mirroring capability and extend protection from hard disk errors to same-computer, same-room, and same-city faults.   ■

List Prices: $2,599 (EISA) and $2,999 (Micro Channel), StandbyServer 32; $2,999, Campus StandbyServer; $999, SnapShot Server; $24,950, Off-SiteServer V.35 pair; $2,995, OptiSpan.

Vinca Corp., 4000 Central Park E., 1815 S. State St., Orem, UT 84058; (801) 223-3100; fax (801) 223-3104; URL http:// www.vinca.com. The company was founded in 1990 and has 62 employees.

MiraLink Corp., 1987 N. Riverside Ave., Provo, UT 84604; (801) 373-8811; fax (801) 373-8822; URL http://www. miralink.com. The company was founded in 1992 and has 14 employees.

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Skirting server disaster

COMPARATIVE REVIEW *The best solution may be a mix of the two we tested*

BY KEN PHILLIPS

Accidents, explosions, floods and fire are inescapable, but the disaster of server downtime is fairly easy to sidestep, based on PC Week Labs' examination of two NetWare server-mirroring solutions.

Nonetheless, our comparative tests of Vinca Corp.'s StandbyServer 2.0 for NetWare and Mira-Link Corp.'s Off-SiteServer V.35 made it clear that selecting the right product for an enterprise takes serious thought.

In fact, a comprehensive strategy to provide both off-site disaster recovery and on-site server fault tolerance may require a mixture of both of the products we tested. For an exploration of how server fault tolerance relates to normal disk mirroring, see the story on Page N3.

Both server-mirroring solutions support NetWare 3.12 and 4.x.

Released by Vinca on May 31, StandbyServer 2.0 for NetWare excels at mirroring a server's drives over a dedicated LAN.

For added flexibility, the $2,999 software-only solution can also use the primary LAN if bandwidth allows or even make use of such higher-speed WAN links as T-1 and T-5 instead for off-site protection.

In comparison, MiraLink's Off-SiteServer V.35 is a WAN-only disaster recovery solution; it began shipping in early January. Although it requires expensive hardware, this solution is better use of inexpensive, low-speed WAN connections for disk mirroring—even down to 56K-bps links—and offers data buffering for WAN fault tolerance.

The rack-mounted Off-SiteServer V.35 costs $15,985 per server/standby pair, plus $2,999 per pair of the necessary Vinca-made disk mirroring adapters. (Vinca's own StandbyServer 2.0 doesn't require these.) Each

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this scenario, users then logged in to the standby server with the same name, although any of their transactions still buffered on the other end might have to be abandoned and re-entered, from a practical point of view.

Because MiraLink's Off-SiteServer buffers the data, such low-speed WAN links as 56K-bps, ISDN or fractional T-1 lines may be used. We established a looping program to copy files, and this generated enough mirrored data to exceed the speed of the 56K-bps link; however, as long as the data does not fill the buffer (in this case, 8¼M bytes), there will be no ill effects. We were able to set the maximum buffer size to a portion of the whole, and when the maximum was reached, the standby mirror drive was dismounted.

Therefore, cheaper WAN connections can quickly pay back the cost of the expensive MiraLink hardware. Enterprises with infrequent but massive spikes of data mirroring, such as with database downloads, do not need high WAN bandwidth for Off-SiteServer.

However, those environments would need lots of WAN bandwidth with Vinca's StandbyServer 2.0, which has no buffering capability and transmits each byte as it comes.

Unfortunately, while StandbyServer 2.0 typically requires T-1 speeds or beyond to keep up with data streams, Off-SiteServer V.35 does not handle high-speed links beyond T-1 or E-1 at all.

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product also needs a pair of CSU/DSUs and a high-speed data line if used in a WAN setup.

And when used to provide server fault tolerance within a local campus, Vinca's StandbyServer 2.0 should be positioned upon a dedicated 100M-bit Ethernet LAN line. The choice of WAN speed is a distinguishing factor between the two products, by virtue of their construction. Off-SiteServer V.35 incorporates two features—data buffering and smart acknowledgment—that give it an edge over StandbyServer 2.0 in WAN environments.

WIDE MIRRORS

MiraLink's Off-SiteServer hardware includes a disk drive that acts as a WAN link buffer. When data must be mirrored to the remote standby, the Vinca-made adapter in the primary MiraLink server tricks NetWare into

thinking it is a locally mirrored disk drive. In our tests, the disk mirroring card then gobbled up as much as 160M bits of data per second, shuttling it directly to the Off-SiteServer V.55's disk.

Here, data can be stored for moments or days. If the WAN link fades in a slowdown or fails altogether, the data remains in this nonvolatile storage until the link is restored.

At the standby on the other end of the link, a similar configuration exists that allowed the standby to become the primary server via a simple reboot. We forced the original primary to fail and then later brought it back online, rebooting it as the new standby; the mirrored data was then ported over to it until it became current.

If the WAN link should fail entirely while the Off-SiteServer primary remains operational, the standby can take the place of the primary for its local users. In our tests of